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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,624	08/05/2003	Takashi Kurumisawa	116485	5362
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EXAMINER				
BODDIE, WILLIAM				
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2629				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/633,624

**Applicant(s)**

KURUMISAWA ET AL.

**Examiner**

WILLIAM L. BODDIE

**Art Unit**

2629

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 5, 6 and 12-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-6 and 12-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. In an amendment dated, May 29<sup>th</sup>, 2008, the Applicants traversed the rejections of claim 5-6 and 12-15. Currently claims 5-6 and 12-15 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 29<sup>th</sup>, 2008 has been entered.

#### ***Response to Arguments***

3. Applicant's arguments filed May 29<sup>th</sup>, 2008 have been fully considered but they are not persuasive.

4. On pages 4-5 of the Remarks, the Applicants argue that neither Greier nor Biggs disclose that the gray scale values are adjusted for pixel groups that consist of pixels corresponding to a same single pixel. The Applicants maintain that there is no teaching that the pixel groups of Biggs that result from a same original pixel would be the same pixel group used by Greier to adjust grayscale values.

The Examiner must respectfully disagree. Applicants are directed to figure 1b of Biggs which details a 2:1 expansion from fig. 1a. Specifically note the location and arrangement of the new pixels. The first and second pixels in the first and second rows correspond to the same original pixel. Now turning to Greier and figure 19 when the

sub pixel pattern is applied to the Biggs expansion in fig. 1a we see that the two patterns align quite well and fulfill the limitations of the claims.

It should further be noted that there are few limitations within the claims which detail the connection between the viewing angle range adjustment device and the pixel groups. All that is required by the currently worded claims is that grayscale values be set within the pixel groups. In short there is no requirement that the pixel group be the basis for scaling the grayscale values.

5. On pages 5-6 of the Remarks, the Applicants argue that Greier does not disclose setting different grayscale values for the same color sub pixels of adjacent pixels. The Examiner must respectfully disagree.

As noted by the Applicants, Greier discloses a bright and dark sub pixel, denoted by crosshatching. Also noted by the Applicants is the positive and negative polarity assigned individually to each sub pixel. While the bright and dark sub pixels clearly indicate a different grayscale, the polarity of the pixel also has an inherent effect on the grayscale of the sub pixel. While the effect is certainly smaller than the bright and dark selection, the polarity still has an inherent effect on the grayscale. Thus a red sub pixel which is denoted as dark/positive polarity has a different grayscale from a red sub pixel with a dark/negative polarity. As such figure 19 of Greier does indeed disclose a different grayscale value for the same color sub pixels of adjacent pixels. For further discussion of the inherent effect polarity has on grayscale Applicants are directed to the evidentiary reference to Aoki (US 2002/0044126) paragraph 21.

6. On page 6 of the Remarks, the Applicants argue that Greier does not disclose setting gray scale values according to the viewing angle characteristic of the color of the sub pixel. The Examiner must respectfully disagree.

Column 4, lines 11-21 seems to quite clearly state just this limitation. Greier states, in part, that the invention takes "into consideration the non-ideal luminance characteristics of the sub pixels of the panel, thereby improving the displayed image by suppressing or eliminating level reversal and color shift over a wide range of viewing angles." Additional discussion is found in column 4, lines 45-49 which discloses that sub pixel colors are restricted to a range having well-behaved states. These disclosures by Greier are seen as more than sufficient to satisfy the limitation that the grayscale values be adjusted according to the viewing angle characteristics of the color of the sub pixel.

For the above reasons the rejections are seen as sufficient and proper and are thus maintained in the current office action.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5-6 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. (US 6,801,220) in view of Biggs (US 5,886,682).

**With respect to claim 5**, Greier discloses, an image display device, comprising:

a display unit (fig. 5);

a viewing angle range adjustment device that sets grayscale values within the pixel groups of the image data (col. 13, lines 11-32), each of the pixel groups including image data of four pixels each including sub pixels corresponding to a plurality of colors (R,G, B in fig. 19), the viewing angle range adjustment device setting grayscale values of different color sub pixels within a same pixel group (fig. 19) of the pixels based on different viewing angle characteristics of the different color sub pixels (col. 4, lines 11-21); and

a display device for displaying the image data on the display unit (112 in fig. 3);

the viewing angle range adjustment device sets different grayscale values for the same color sub pixels of adjacent ones of the first, second, third and fourth pixels (clear from fig. 19 that all of the adjacent color sub pixels have alternate grayscale values).

Greier does not expressly disclose a resolution conversion device.

Biggs discloses, a resolution conversion device (fig. 2) that converts original image data (fig. 1a, for example) for a single pixel to resolution-converted image data including image data of first, second, third and fourth pixels (clear from fig. 1b); and

a display device for displaying the resolution-converted image data on the display unit (34 in fig. 2).

Biggs and Greier are analogous art because they are from the same field of endeavor namely, matrix display control circuitry and methods of displaying data.

At the time of the invention it would have been obvious to one of ordinary skill in the art to convert the incoming video signals of Greier, to automatically copy the image

data to fit the resolution of the device as taught by Biggs, and subsequently adjusting the sub pixel luminances as taught by Greier.

As to the additional limitation requiring that the resolution conversion be performed prior to adjusting the viewing angle by ensuring a checkered pattern of gray scales, this order of processes is seen as inherently required by the combination of devices. The resolution conversion process, of Biggs, essentially introduces additional data. Greier's device, however, manipulates the grayscale of each sub pixel to produce a specific pattern of grayscales amongst the sub pixels (see figs. 13-21).

If the original data were set to the checkered pattern of Greier, and then converted to the screen's resolution, by Biggs, Greier's pattern would be destroyed and the benefits of a wider viewing angle would not be enjoyed. As such it would have been clear to one of ordinary skill in the art that the resolution conversion process must inherently occur prior to instilling a wider viewing angle in the display data.

The motivation for doing so would have been to quickly resize bitmaps using only minimal processor time (Biggs; col. 2, lines 46-50).

**With respect to claim 6**, Greier and Biggs disclose, the image display device according to claim 5 (see above).

Greier further discloses, each subpixel corresponding to each color of R, G and B (fig. 20);

the viewing angle range adjustment device comprising:

a lookup table that stores display characteristics of the display unit for each color of R, G, and B; and a device that determines the grayscale values of the sub pixels for

each color with reference to the lookup table (col. 19, lines 37-40, which details operations based on stored RGB values).

**With respect to claim 12**, Greier and Biggs disclose, the image display device according to claim 5 (see above).

Greier further discloses, the viewing angle adjustment device setting the same grayscale value for two different color sub pixels of the first and second pixels (this should be clear from fig. 19 where two different color sub pixels do have the same grayscale value).

**With respect to claim 13**, Greier and Biggs disclose, the image display device according to claim 5 (see above).

Greier further discloses, wherein sub pixels of the single pixel after converting the resolution have the same grayscale values (col. 15, lines 49-55, for example).

**With respect to claim 14**, Greier discloses, an image display device comprising:  
a display unit (fig. 5) comprising a plurality of display pixels, each display pixel having a plurality of differently-colored sub pixels (R,G,B in fig. 19; for example);  
a memory storing a look-up table (301 in fig. 5), the look-up table including information on viewing-angle characteristics for each of the differently-colored sub pixels of the display unit (col. 19, lines 37-40, which details operations based on stored RGB values);

a viewing angle range adjustment device that adjusts grayscale values within groups of image pixels of the image data (col. 13, lines 11-32), each group of image pixels consisting of the first, second, third and fourth pixels (fig. 19), the viewing angle



range adjustment device, within each group of image pixels, adjusting grayscale values of each sub pixel of each group of image pixels according to the viewing angle characteristics of the color of the sub pixel (col. 4, lines 11-21); and

a display device for displaying the image data on the display unit (112 in fig. 3);  
wherein the viewing angle range adjustment device, within each group of image pixels, adjusts the grayscale values to be different for the same color sub pixels of the corresponding first, second, third and fourth pixels (clear from fig. 19 that all of the adjacent color sub pixels have alternate grayscale values), and

wherein the different adjustments made by the viewing angle range adjustment device to the different color sub pixels of each group of image pixels results in substantially the same viewing image performance per viewing angle (fig. 29).

Greier does not expressly disclose a resolution conversion device.

Biggs discloses, a resolution conversion device (fig. 2) that converts original image data (fig. 1a; for example) received by the image display device, the resolution conversion device converting each image pixel of the original image data into first, second, third and fourth pixels (clear from fig. 1b); and

a display device for displaying the resolution-converted image data on the display unit (34 in fig. 2).

At the time of the invention it would have been obvious to one of ordinary skill in the art to convert the incoming video signals of Greier, to automatically copy the image data to fit the resolution of the device as taught by Biggs, and subsequently adjusting the sub pixel luminances as taught by Greier.

As to the additional limitation requiring that the resolution conversion be performed prior to adjusting the viewing angle by ensuring a checkered pattern of gray scales, this order of processes is seen as inherently required by the combination of devices. The resolution conversion process, of Biggs, essentially introduces additional data. Greier's device, however, manipulates the grayscale of each sub pixel to produce a specific pattern of grayscales amongst the sub pixels (see figs. 13-21).

If the original data were set to the checkered pattern of Greier, and then converted to the screen's resolution, by Biggs, Greier's pattern would be destroyed and the benefits of a wider viewing angle would not be enjoyed. As such it would have been clear to one of ordinary skill in the art that the resolution conversion process must inherently occur prior to instilling a wider viewing angle in the display data.

The motivation for doing so would have been to quickly resize bitmaps using only minimal processor time (Biggs; col. 2, lines 46-50).

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. (US 6,801,220) in view of Biggs (US 5,886,682) and further in view of Kondo et al. (US 7,009,579).

**With respect to claim 15**, Greier and Biggs disclose, an image display device according to claim 14 (see above).

Greier, when combined with Biggs, discloses, wherein the image display device receives images for display having a first resolution (Biggs; fig. 4a; for example) and displays the images at a resolution greater than the first resolution (Biggs; fig. 4b; for example).

Neither Greier nor Biggs expressly disclose, the image display device is a handheld wireless communication device.

Kondo discloses, an image display device that is a handheld wireless communication device (1-2 in fig. 2; for example).

Greier, Biggs and Kondo are analogous art because they are all from field of endeavor namely matrix display control circuitry and methods of displaying compensated data.

At the time of the invention it would have been obvious to one of ordinary skill in the art to apply the image display device of Greier and Biggs to a cell phone as taught by Kondo for the well-known benefit of extending viewing angle compensation to a well-established display market.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Aoki (US 2002/0044126) discloses that negative and positive polarity weighted sub pixels generate different grayscales.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM L. BODDIE whose telephone number is (571)272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 2629

/William L Boddie/  
Examiner, Art Unit 2629  
7/10/08